Abstract:

Title: Isolation of human dental pulp derived mesenchymal stem cell implementing enzymatic digestion

Introduction: Nowadays, mesenchymal stem cells are considered as a unique source of adult stem cells which is usually accessible with minimum ethical concerns. These cells could be applied in stem cell biology, differentiation into other cells, tissue engineering, regenerative medicine and forthcoming cancer treatment research. The aim of the present study was to isolate dental pulp derived stem cells (DPSCs), characterize them with common techniques.

Materials and Methods: After collecting teeth, the pulp chamber exposed and pulp tissue digested with collagenase IV enzyme. Then, dental pulp derived cells were resuspended and incubated in alpha modified minimum essential medium eagle (αMEM) supplemented with 15% fetal bovine serum at 37°C temperature, 95% humidity and 5% CO2. The osteogenic and adipogenic differentiation potentials for dental pulp derived cells were assessed in appropriate conditions. Flow-cytometry analyses were utilized to evaluate the percentage of CD90 and CD45 positive markers within isolated cells.

Results: Dental pulp derived cells had appropriate attachment to the culture vessels and showed the high proliferation rate on culture condition. These cells were proper to bone and fat differentiation as displayed by Alizarin red and Oil red staining. While, higher percentage of pulp derived cells were CD90 positive, the negligible percentage of CD45, which is a marker of hematopoietic cells, was estimated.

Conclusion: Dental pulp derived cell are mesenchymal stem cells .

Keywords: Mesenchymal stem cells, Dental pulp, Differentiation, Neural crest